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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Waisman, et al
Serial Number: CIP-1 09/348,142
Filed: 07/02/99
For: Deuterium Heat Generator

Group Art 3641
Examiner: Behrend

9-24-01

#2/A

THE HONORABLE COMMISSIONER OF PATENTS AND TRADEMARKS

Washington D. C.

Santa Ana, California
September 17, 2001

Dear Sir:

AMENDMENT AS A CONTINUATION IN PART

In response to the Office action of April 18, 2001, we submit CIP-2. Copies of new References 5 & 6 are enclosed.

IN THE SPECIFICATION:

We submit an amended Specification and a marked-up version of the old Specification, including claims, noting deletions, changes and additions. This amendment is made in response to the Examiner's comments in the Office Action letter pertaining to inadequacies in the old Specification. The changes and the reasons for each change are noted below. The page numbers noted below refer to the "marked-up" version of our pending application and to the 'first' page of a noted change.

Page 1: • Reference 3 is deleted. No longer referred to in the Specification.
• Reference 5 is changed to call for an updated version of TN-7.1.
• Reference 6 is added. A report of recent tests at SRI replicating four successful experiments which verify the production of helium and tritium in the D-Pd system.

- The previous "Background of the Invention" has been deleted in its entirety and replaced. This statement now briefly recalls the many failed experiments cited by the examiner, notes the new reality of 'cold nuclear fusion' in the deuterium-palladium system and cites how the present invention evolved from the chaos of the past decade.

Page 4:
- Changes in the "Brief Summary of the Invention" (1) clarify that the present invention is a reactor and system with a method for containing and controlling a deuterium nuclear fusion reaction in a host metal lattice; (2) summarize the enabling method; (3) relate the necessary energy relationships to the range of operating temperatures and pressures; (4) clarify the host metal selection method.

Page 5:
- Changes in the "Brief Description of the Drawings": (Please see the following section "IN THE DRAWINGS".)

Page 6:
- The "Reactor Assembly" section is added to: (1) better organize the ensuing sections; (2) make reference to Figure 4; and (3) describe an example of a 'permanent sealing' device.

Page 7:
- The "Reactor Body" section now includes two specific candidate materials for fabrication of the reactor body and indicates the operating temperature ranges available when each is used.

Page 9:
- Statement about a mixture of gases is deleted. Limits on mixed gases are not known at this time.
- Changes in "How the Reactor Works": (1) states the objective of the 'method' described; (2) clarifies that no specific D/Pd concentration is required for operability; (3) clarifies that it is the 'change of state' of the dissolved deuterium that enables the fusion reaction; (4) clarifies that the gas chemical potential is controlled by controlling the gas pressure and the reactor temperature; (5) cites Reference 5 for the relationship between the gas chemical potential and that of the dissolved deuterium; and (6) makes reference to a later section for predicting performance of sealed reactors.

Page 10:
- Changes in the "Chemical Potential" section: (1) cites Reference 5 for the derivation of chemical potential and its meaning in terms of the 'system free energy state'; (2)

clarifies that the method for selecting host metals is by conducting screening tests in a 'scanning reactor' to measure the threshold chemical potential of a candidate host metal; (4) describes the method of determining the relationship between operating chemical potential and the power density for a selected candidate host metal; (5) describes the necessary qualities of the scanning reactor and its operating range.

Page 13: • Adds "Host Metal Installation" section which cites three candidate method of installing the host metal in the reactor body. (Applicable text from "Host Metal" section on Page 8 has been incorporated here.)

Page 14: • Change to "System Control" section cites the reaction heat rate as being an exponential function of temperature.

Page 15: • Adds "Control of the Sealed Reactor" section that clarifies that increasing the heat rate of the sealed reactor is by increasing the operating chemical potential. It cites the need to predict the internal pressures as the temperature is increased so that the operating chemical potentials may then be predicted and matched to the host metal heat rate characteristics.

Page 15: • Adds the title "Predicting the Performance of Sealed Reactors" to the unchanged text from the old Specification.

Page 17: • Adds "Useful Life of the Sealed Reactor" section to explain (1) how the deuterium depletion takes place, (2) how it affects the heat rate and (3) the necessary corrective measures to extend the useful life of the sealed reactor.

Page 18: • Minor changes to (1) correct references to the enabling heater added to Figures 1 & 2 and (2) to cite an alternate procedure when the selected loading temperature is too low.

Page 20: • The procedure for increasing the operating temperature of a sealed reactor is added.

IN THE DRAWINGS:

Figure 1 is changed to show the enabling heater.

Figure 2 is added to depict a typical reactor with fins for heat transfer.

Figure 3 was Figure 2.

Figure 4 is added to show a typical alternate location for the host metal.

Figure 5 was Figure 3.

Figure 6 is added to show the arrangement of the 'scanning' reactor.

Figure 7 is added to visualize the broad operating range of the present invention.

Figure 8 is added to incorporate the "D-Pd TCP Equilibrium Diagram" into the Specification rather than relying on Reference 4 to show the equilibrium data.

Figure 9 is added to show experimental data in terms of power density.

IN THE CLAIMS:

Claim 1 is modified to add reference to 'elevated system free energy states' for dependent claims of methods.

Claim 2 was deleted by an earlier amendment.

Claim 3 is modified to correct the format of the claim and to delete an unnecessary statement.

Claim 4 is modified to correct the format of the claim.

Claims 5 through 16 are unchanged.

Claim 17 is deleted since the 'deposited form' is a 'solid' form of the host metal and therefore is covered by claim 19.

Claims 20 claims the method of operating the system of claim 1.

Claims 21 claims the method of operating the system of claim 3.

Claim 22 claims the system for measuring the threshold chemical potential and the heat rate of the host metal.

Claim 23 claims the method of producing high deuterium chemical potentials using the system of claim 22.

Claim 24 claims the method for measuring the threshold chemical potentials of candidate host metals using the system of claim 22.

Claim 25 claims the method for measuring the heat generation rates of the candidate host metals using the system of claim 22.

Claim 26 claims the method of generating heat using the system of claim 1.

Claim 27 claims the method of generating heat using the system of claim 3.

The claims are presented in the new and the marked-up versions attached.

For purposes of examination: (1) claims 1, 3, 4, and 18 through 27 read on palladium as the elected ultimate host metal; (2) claims 1, 3 through 16 and 20 through 27 read on powder as the elected ultimate form of host metal. Note that we now elect the 'powdered' form as the ultimate form of the host metal instead of the 'deposited' form.

REMARKS

Remarks about the examiner's comments in the Office action letter are enclosed along with 12 enclosures. It is recommended that the Examiner read Enclosure 5 "This Invention vs Prior Art" before starting the examination to save time.

Respectfully submitted,

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